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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/600,813	06/20/2003	Kazuhiko Murata	52663-00006USPT	9251

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EXAMINER

VANNUCCI, JAMES

ART UNIT PAPER NUMBER

2828

DATE MAILED: 04/11/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

SM

Office Action Summary

Application No.

10/600,813

Applicant(s)

MURATA ET AL.

Examiner

Jim Vannucci

Art Unit

2828

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 June 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5, 7-19 and 22 is/are rejected.
- 7) ☒ Claim(s) 6, 20 and 21 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 September 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 3-5-04.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-4, 15-18 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsunaga(6,421,362) in view of Liu et al.(6,667,661).

Claims 1 and 16, figure 1 of Matsunaga discloses a driver circuit(6) having at least one input node and an output node adapted to receive an input data signal(VH & HI) at an input node and provide an output signal(H2) at output node in response to the data signal, and a transformer(9) coupled to the output node of the driver circuit(through no. 8) adapted to receive the output signal(H2) at a first side of the transformer(left side) and to provide an output drive signal from second side of the transformer to drive the laser device(5).

Matsunaga does not disclose a laser diode or impedance compensation.

Figure 3 of Liu discloses a laser diode(333) and using a device(302) connected between a laser diode and a laser diode driver circuit to provide impedance compensation between the laser diode(333) and the laser diode driver circuit(301).

Claims 2 and 17, the first side(left side) of the transformer(9) disclosed in figure 1 of Matsunaga is a primary side and the second side(right side) of the transformer(9) is a secondary side.

Claim 3, figure 1 of Matsunaga discloses the negative terminal of the primary side of the transformer(lower left corner) being adapted to receive the output signal(H2) from the driver circuit(6), and the negative terminal side of the secondary side of the transformer(lower right corner) being adapted to provide the output drive signal.

Claims 4 and 18, figure 1 of Matsunaga discloses a transformer(9) with a primary side. Figure 3 of Liu discloses impedance matching that would include adapting an electrical element(302) to compensate for a parasitic capacitance associated with the driver circuit at a first frequency of operation(abstract).

Claim 15, figure 1 of Matsunaga discloses a pre-driver circuit(4) adapted to provide the input data signal to the driver circuit(6).

Claim 22, figure 3 of Liu discloses the step of providing the output drive signal to the laser diode device using a transmission line(332).

It would have been obvious to one of ordinary skill in the art at the time of the invention to use the transformer disclosed in Matsunaga as an impedance compensating device as disclosed in Liu for improved laser diode driver performance as disclosed in Liu.

3. Claims 5, 7-10, 12-13 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsunaga in view of Liu as applied above, and further in view of Hedberg et al.(4,435,734).

Matsunaga and Liu do not disclose resistors coupled to the transformer.

Claims 5 and 19, figure 12 of Hedberg discloses a primary side resistor(R72) coupled parallel with the primary side of the transformer adapted to repress an output impedance associated with the primary side of the transformer at a second frequency of operation higher than the first frequency of operation(col. 14, lines 55-57).

Claim 7, figure 12 of Hedberg discloses a secondary side resistor(R75) coupled in parallel with the secondary side of transformer(9) where the secondary side resistor and the secondary side of the transformer can be adapted to compensate for the impedance of the termination resistor at a third frequency of operation(col. 14, lines 58-63).

Claim 8, figure 1 of Hedberg discloses the use of an output switch architecture(11) in a driver circuit.

Claim 9, figure 5 of Hedberg discloses using a differential amplifier(not numbered) in a driver circuit.

Claim 10, figure 9 of Hedberg discloses a first switch transistor(Q53) adapted to receive a first differential input data signal(B) of the input data signal at a first gate node, a second switch transistor(Q54) adapted to receive a second differential input data signal(C) of the input data signal at a second gate node, where a first emitter node of the first switch transistor is connected to a second emitter node of the second switch transistor and a first collector node of the second switch transistor is adapted to provide an output signal to the transformer(9) disclosed in figure 1 of Matsunaga if the transistor arrangement is used as part of the driver(6) disclosed in figure 1 of Matsunaga.

Claim 12, figure 3 of Liu discloses a laser diode driver output stage with a current generator(320) coupled to a first emitter node(310) and the second emitter node(311).

Claim 13, the negative terminal of first side(lower left corner) of the transformer(9) disclosed in figure 1 of Matsunaga would be adapted to receive the output signal from the first collector node of the second switch transistor(Q54) disclosed in figure 9 of Hedberg if the transistor configuration disclosed in Hedberg were used in the driver circuit(6) disclosed in Matsunaga. A negative terminal of the second side of the transformer(9) disclosed in figure 1 of Matsunaga is adapted to provide the output drive signal.

Claim 14, figure 3 of Liu discloses using an electronic element between a laser and laser driver to compensate for undesired impedances. The first side the transformer disclosed in Matsunaga could be adapted to compensate for a parasitic capacitance associated with the first collector node of the second switch transistor at first frequency of operation since it is an undesired impedance.

It would have been obvious to one of ordinary skill in the art at the time of the invention to use the above electronic elements disclosed in Hedberg in the device disclosed in Matsunaga and Liu for improved performance as disclosed in Hedberg(col. 14, line 58 to col. 15, line 10).

4. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Matsunaga in view of Liu and Hedberg as applied above, and further in view of Koai et al.(5,194,979).

Matsunaga, Liu and Hedberg do not disclose a bipolar transistor.

Claim 11, Koai discloses using a bipolar junction transistor in a laser diode driver(col. 7, line 13) for an improved impedance transformer(abstract).

It would have been obvious to one of ordinary skill in the art at the time of the invention to use the bipolar transistor disclosed in Koai in place of the transistors disclosed in Hedberg for improved impedance matching performance in a transformer as disclosed in Koai.

Allowable Subject Matter

5. Claims 6 and 20-21 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.
6. The following is a statement of reasons for the indication of allowable subject matter. The following limitations are primarily responsible for distinguishing these claims over the prior art.

Regarding claims 6 and 20-21, the limitations concerning a termination resistor coupled to a positive terminal of the primary side of the transformer wherein the output impedance of the laser diode driver output stage is substantially equal to the impedance of the termination resistor at a third frequency of operation lower than the first frequency of operation.

Drawings

7. Figure 1 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g).
8. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) that appear to be incorrectly labeled: Vee and the number 236.

Corrected drawing sheets in compliance with 37 CFR 1.121(d), or amendment to the specification to add the reference character(s) in the description in compliance with 37 CFR 1.121(b) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.


Correspondence

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Jim Vannucci whose phone number is (571) 272-1820.

Any inquiry of a general nature or relating to the status of this application should

be directed to the Technology Center whose telephone number is (703) 308-0956.

Papers related to Technology Center 2800 applications only may be submitted to Technology Center 2800 by facsimile transmission. Any transmission not to be considered an official response must be clearly marked "DRAFT". The faxing of such papers must conform with the notice published in the Official Gazette, 1096 OG 30 (November 15, 1989). The Technology Center Fax Center number is (703) 872-9306.


James Vannucci